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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Tetsuji Suzuki

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10/06/2004

JACOBSON HOLMAN
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EXAMINER

BLACKMAN, ROCHELLE ANN J

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/693,969	Applicant(s) SUZUKI ET AL.	
	Examiner Rochelle Blackman	Art Unit 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: on pg. 15, line 19, "Ns" should be - -Na- - or on line 21, "Na" should be - -Ns- -.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Kusano et al. (U.S. Patent No. 6,190,014).

Regarding claims 1-3, Kusano discloses a color-separating and -recombining optical system (see FIGS. 1-6) comprising at least one prism assembly (1B) made up of at least two prisms (1a and 1b) bonded to each other with a bonding layer (1c) formed between the prisms, thickness of the bonding layer being varied depending on a length of each optical path of color light components incident into the optical system and reaching the bonding layer via one of the prisms (see col. 8, line 40 to col. 9, line 35); wherein a difference in refractive index between the prisms and the bonding layer is 0.1 or larger (see col. 10, FIRST EXAMPLE and SECOND EXAMPLE); wherein the

difference in refractive index is 0.3 or larger (also see col. 10, FIRST EXAMPLE and SECOND EXAMPLE).

Regarding claims 4-7, Kusano discloses a color-separating and -recombining optical system (see FIGS. 1-6) provided between a light source (3) and a projection lens (3) in a projection display, having at least one prism assembly (1B) made up of at least two prisms (1a and 1b) bonded to each other with a bonding layer (1c) formed between the prisms, a white light (light from light source 3) emitted from the light source being divided into red-, green-, and blue-color light components (see function of 94a, b and 98) related to primary colors, the light components being modulated by spatial light modulators (45R, 45G, 45B) in accordance with a video signal, the modulated light components being combined (see function of 99) and projected onto a screen (see col. 7, lines 24-26) via the projection lens, thickness of the bonding layer being varied as thin and thick for optical paths long and short, respectively, from the spatial light modulators to the bonding layer which each modulated light component emitted from the corresponding spatial light modulator reaches (see col. 8, line 40 to col. 9, line 35); comprising a plurality of prism assemblies (1B, 1R, 1G - see col. 9, lines 50-56) each made up of at least two prisms (1a and 1b - also see col. 9, lines 50-56) bonded to each other with a bonding layer (1c - also see col. 9, lines 50-56) formed between the prisms, thickness of the bonding layer of one of the prism assemblies (anyone of 1B, 1R, 1G), provided as closest to the projection lens in relation to other prism assemblies, being varied as thin and thick for optical paths long and short, respectively, from the spatial light modulators to the bonding layer which each modulated light component emitted

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from the corresponding spatial light modulator reaches (see col. 8, line 40 to col. 9, line 35); wherein a difference in refractive index between the prisms and the bonding layer is 0.1 or larger (see col. 10, FIRST EXAMPLE and SECOND EXAMPLE); wherein the difference in refractive index is 0.3 or larger (also see col. 10, FIRST EXAMPLE and SECOND EXAMPLE).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7 rejected under 35 U.S.C. 102(e) as being anticipated by Aastuen et al (U.S. Patent No. 6,786,604).

Regarding claims 1-3, Aastuen discloses a color-separating and -recombining optical system (see FIGS. 1-19) comprising at least one prism assembly (1100 or 1500 or 1624, 1642, 1648 or 1820, 1832 or 1924, 1942, 1948) made up of at least two prisms (1102 and 1104 or 1502 and 1504 or see the two prisms formed by the diagonal bisecting layer formed in 1624, 1642, 1648 or 1820, 1832 or 1924, 1942, 1948) bonded to each other with a bonding layer (1106 or 1514 or 1952) formed between the prisms, thickness of the bonding layer being varied depending on a length of each optical path of color light components incident into the optical system and reaching the bonding layer via one of the prisms (see col. 14, lines 20-47, see col. 17, line 58 to col. 18, line

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2, and col. 19, line 51 to col. 20, line 51); wherein a difference in refractive index between the prisms and the bonding layer is 0.1 or larger (see col. 14, lines 30-37); wherein the difference in refractive index is 0.3 or larger (also see col. 14, lines 30-37);

Regarding claims 4-7, Aastuen discloses a color-separating and -recombining optical system (for example, see 1600 or 1900 in Figs. 16 and 19) provided between a light source (1604, 1606) and a projection lens (1652) in a projection display, having at least one prism assembly (1100 or 1500 or 1624, 1642, 1648 or 1820, 1832 or 1924, 1942, 1948) made up of at least two prisms (see 1102 and 1104 or 1502 and 1504 or see the two prisms formed by the diagonal bisecting layer formed in 1624, 1642, 1648 or 1820, 1832 or 1924, 1942, 1948) bonded to each other with a bonding layer (see 1106 or 1514 or 1952) formed between the prisms, a white light (1602) emitted from the light source being divided into red-, green-, and blue-color light components related to primary colors (see col. 15, lines 14-15), the light components being modulated by spatial light modulators (1626, 1640, 1648) in accordance with a video signal, the modulated light components being combined (see function of 1630) and projected onto a screen via the projection lens, thickness of the bonding layer being varied as thin and thick for optical paths long and short, respectively, from the spatial light modulators to the bonding layer which each modulated light component emitted from the corresponding spatial light modulator reaches (see col. 14, lines 20-47, col. 19, line 51 to col. 20, line 51, and see col. 17, line 58 to col. 18, line 2); comprising a plurality of prism assemblies (1624, 1642, 1648 or 1820, 1832 or 1924, 1942, 1948) each made up of at least two prisms bonded to each other with a bonding layer formed between the

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prisms, thickness of the bonding layer of one of the prism assemblies, provided as closest to the projection lens in relation to other prism assemblies, being varied as thin and thick for optical paths long and short, respectively, from the spatial light modulators to the bonding layer which each modulated light component emitted from the corresponding spatial light modulator reaches (see col. 14, lines 20-47, see col. 17, line 58 to col. 18, line 2, and col. 19, line 51 to col. 20, line 51); wherein a difference in refractive index between the prisms and the bonding layer is 0.1 or larger (see col. 14, lines 30-37); wherein the difference in refractive index is 0.3 or larger (see col. 14, lines 30-37).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (U.S. Patent Application Publication No. 2002/0097382) in view of Aastuen et al. (U.S. Patent No. 6,786,604).

Suzuki discloses a projection display (FIGS. 1-17) comprising: a light source (171, 430) for emitting a white light; a polarization plate (181, 440), specific linearly-polarized lights of red-, green-, and blue-color light components related to primary colors of the white light only passing through the polarization plate; a color-separating

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and -recombining optical system (1, 290, 50, 80, 90, 100, 130, 150, 160, 170, 180) having first to fourth optical components (2-5 or 102-105) having polarization-splitting planes intersecting each other like a character-"X" (see 2-5 or 102-105), wavelength-selective polarizing converters (6-9 or 106-109) for rotating the plane of polarization of the red-, green-, and blue-color light components by 90 degrees, one of the converters (6 or 106) being placed at a light-incident side of the first optical component (2 or 102), another of the converters (7 or 107) being placed at a light-emitting side of the fourth optical component (5 or 105), the first and the fourth optical components (2 and 5 or 102 and 105) being provided at a light-incident side and a light-emitting side, respectively, of the optical system, the first and the fourth optical components (2 and 5 or 102 and 105) being arranged as diagonally opposing each other, and the remaining converters (8 and 9 or 108 and 109) being placed between at least two inner facing planes of the first to the fourth optical components; first, second and third spatial light modulators(61-63 or 161-163), the first modulator (61 or 161) being provided in front of a light-emitting side of the second optical component (3 or 103), the second and third modulators (62 and 63 or 162 and 163) being provided in front of light-emitting sides of the third optical component (4 or 104); and a projection lens (191) provided at the light-emitting side of the optical system, via which an output light beam from the optical system is projected onto a screen, wherein at least the fourth optical component provided at the light-emitting side of the optical system is a prism assembly made up of at least two prisms bonded to each other with a bonding layer formed between the prisms (see pg. 6, paragraph [0098], lines 1 and 2); wherein at least one of the first, the

second and the third optical components is a prism assembly made up of at least two prisms bonded to each other with a bonding layer formed between the prisms (also see pg. 6, paragraph [0098], lines 1 and 2); wherein the spatial light modulators are reflective spatial light modulators (see pg. 2, paragraph [0025] and pg. 5, paragraphs [0068], [0072], and [0077]); wherein the optical components are polarization beam splitters (see pg. 4, paragraph [0057]).

Suzuki does not appear to disclose the thickness of the bonding layer being varied as thin and thick for optical paths long and short, respectively, from the spatial light modulators to the bonding layer which each modulated light component emitted from the corresponding spatial light modulator reaches; wherein a difference in refractive index between the prisms and the bonding layer is 0.1 or larger; and wherein the difference in refractive index is 0.3 or larger; wherein the prisms are dichroic prisms; and wherein at least two of the optical components are a polarization beam splitter and a dichroic prism.

Aastuen discloses a projection system having low astigmatism comprising PBS 1500 formed of two glass prisms 1502 and 1504, with MRPB film 1506 sandwiched between and wedge plate 1514 disposed between MRPB film 1506 and one of prisms 1502 and 1504, where wedge plate 1514 is formed from optical adhesive, that adheres MRPB film 1506 to prism 1504 and wedge angle, α , required for astigmatism correction is used to calculate the thickness, w , which is used to change the optical path length at the center of PBS 1500 (see Fig. 15 and col. 19, line 51 to col. 20, line 51). Further, Aastuen discloses PBS 1104 formed of two prisms 1102 and 1104 with two layers,

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MRPB/adhesive layer 1106 and high index layer 1108, where prisms 1102 and 1104 have a refractive index of 1.85 and MRPB/adhesive layer 1106 has a refractive index of 1.56, thus a difference in the refractive indexes equaling 0.3 (see col. 14, lines 20-34). Finally, Aastuen discloses dichroic combiner 1310 formed from two prisms 1322 and 1324 and plates 1326 and 1328 of high index material that are selected to have thicknesses that substantially reduce astigmatism (see Fig. 14 and col. 19, lines 21-31) and wedge astigmatism compensation may be introduced in other components, for example in a dichroic separator/combiner or in an X-cube combiner (see col. 20, lines 40-43).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the color-separating and –recombining optical system of the Suzuki reference with a PBS and/or dichroic separator/combiner having two prisms having a refractive index of 1.85 and a wedge plate or adhesive layer having a refractive index of 1.56, like those of the Aastuen reference, in order to change the optical path length at the center of the PBS, while separating and/or combining color light, in the optical system of the Suzuki reference, thus providing astigmatism compensation.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rochelle Blackman whose telephone number is (571) 272-2113. The examiner can normally be reached on M-F 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RB


JUDY NGUYEN
PRIMARY EXAMINER